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ABSTRACT

The primary purpose of this study was to compare, from a social/cognitive perspective, computer free play with more traditional preschool free play. Secondary objectives were to find out whether there were gender differences in the duration and type of computer play and whether receptive language differences or sociometric status affected the use of the computer. Participants were 20 female and 23 male children, ranging in age from 3 to 5 years, who attended preschool classes on the campus of Utah State University. Play in five play areas was observed according to the Parten-Smilansky social/cognitive play hierarchies. No gender differences were found in the amount of time or type of play at the computer. Sociometric status did influence computer play, with those children who engaged in more positive social interactions using the computer constructively. Group constructive play was the most significant type of play observed at all areas. This observation suggests that computers may foster socialization in young children. Four pages of references conclude the document. (RH)

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A Comparison of Traditional Preschool and Computer Play From a Social/Cognitive Perspective

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ABSTRACT

In this study, traditional preschool play was compared with computer play using the Parten-Smilansky social/cognitive play hierarchy. No gender differences were found in terms of the amount of time or type of play at the computer. Sociometric status did influence computer play with those children who engaged in more positive social interactions using the computer constructively. Group constructive play was the most significant type of play observed at all centers, suggesting that computers may foster socialization in young children.

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INTRODUCTION AND PURPOSE

Children's play has been a controversial area of investigation over the past century. While the research scope has indeed been broad, what is most apparent is that inconsistencies exist regarding not only the theories of play, but the definition of play as well. "Play seems to represent that definitionally impossible 'wastebasket' category of behavior" (Gilmore, 1971, p. 311). Wide differences of opinion exist regarding play (Rubin, Fein, & Vandenberg, 1983).

Educators generally believe that preschool children learn through play and that play opportunities emanate from their environment. Computers are increasingly more apparent in the preschool environment with predictions indicating even greater use with time. However, the impact of the computer as part of the preschool play environment remains virtually unknown. Uncertainty exists regarding the proper role of computers. Fear is voiced that traditional classroom activities will be replaced rather than complemented by the computer. Concerns are expressed that computers may produce a generation of social isolates. Little is known about how young children most effectively use computers and what types of social and cognitive behaviors take place at the computer.

The primary purpose of this study was to compare computer freeplay with more traditional preschool freeplay from a social/ cognitive perspective. Traditional play was represented by block play, dramatic play, the art center, and manipulative toys. Young children's play was observed using the Parten-Smilansky social/ cognitive play hierarchies. This incorporates five types of social play from the original Parten study (1932): playing alone, playing near others, playing with others, watching others, or engaged in unoccupied behaviors. Nested within these social catagories are four types of cognitive play based on Piaget's work (1962) and categorized by Smilansky (1968). These four cognitive types of play are: functional - repetitive movements of materials, constructive - constructing with materials, dramatic - verbal fantasizing, and

games with rules - playing games with specific rules. The nested use of these play categories have served as the framework for numerous child play studies (Rubin, Maioni & Hornung, 1976; Rubin, Watson & Jambor, 1978; Johnson, Ershler & Bell, 1980; Johnson & Ershler, 1981; Rubin, 1982; Rubin & Daniels-Beirness, 1983, Pelegrini, 1985). However, the addition of computer play using the Parten-Smilansky scales has not been attempted, to our knowledge.

The secondary objectives of this study were to find out whether there were gender differences in the duration and type of computer play and whether receptive language differences or sociometric status affected the use of the computer. The inclusion of both sociometric status and receptive language abilities should provide a clearer understanding of play because children's friendship patterns and language skills, often an integral feature in play, will be defined.

Therefore, this research will address these five questions:

1) Do gender differences exist in preschool computer play as measured by the duration of play?
2) Do gender differences exist in preschool computer play as measured by the social/cognitive categories of play?
3) Does receptive language ability affect the use of the computer during freeplay?
4) Does sociometric status affect the use of the computer during play?
5) Does freeplay with the computer differ from more traditional freeplay based on a social/cognitive perspective?

Some studies have addressed only social play. In 1971, Barnes replicated the Parten study. His findings that children of the seventies were less skillful socially than children of the twenties was attributed to modern technology, such as the television, which encourages less social interaction. However, Hawkins, Sheingold, Gearhart & Berger (1982) found significantly more social interaction when children used computers compared with other classroom activities. In Mind At Play, (1983) the Loftuses point out that the socializing potential of computer games is unique.

Other studies have concentrated only on cognitive play. Smilansky (1968) classified Piaget's (1962) three cognitive stages of play into an ontogenetic sequence of behaviors. The influence of computers on cognitive levels of play has been noted by other researchers. Papert (1980) and Ziajka (1983) both suggest that computers allow young children to move from concrete thought to a higher cognitive level, that of symbolic representation. McBride (1985) also indicates that computers help develop cognitive skills.

A number of studies using the nested Parten/Smilansky hierarchies have included gender differences. Rubin, Maioni & Hornung (1976) noted that females engaged in more solitary and parallel constructive behaviors than males. This supports an earlier study by Moore, Evertson & Brophy (1974). Gender differences with computer use have been explored by Swigger, Campbell & Swigger (1983). They found no significant differences between the sexes in the amount of time spent at the computer, a finding also affirmed by Muller & Perlmutter (1985). However, this contrasts with the Piestrup (1981) study in

which girls showed more interest in the computer. Beeson & Williams (1983) noted preschool boys chose the computer three times more frequently than girls.

While opinions differ on gender-related preferences at the computer, many researchers agree that socialization has far reaching implications based on the play environment and the nature of the play materials. Vandenberg (1981) found that social play was strongly influenced by play environments, while Quilitch & Risley (1973) noted the influence of play materials. Unfortunately, in many of the play studies, few have clearly defined the specific play materials used or accounted for a balance between "isolate" and "social" toys. Computer play has not been introduced in play studies utilizing the Parten-Smilansky scales.

If different kinds of toys and environments influence play behaviors, what about children of differing sociometric status or receptive language abilities? Unfortunately, many play studies have failed to incorporate either measures of sociometric status or receptive language ability. The present research includes both measures plus a complete delineation of the specific play materials used. The research on sociometric status suggests that the quality of interactions with peers differs between popular and unpopular children. Ladd (1983) found that socially isolated children tended to play with peers in different ways. It is important to address the issue of sociometric status in any study of play since children play differently with peers of different statuses. Just as sociometric status may influence play behaviors, play may also be affected by

language abilities. Rubin (1982), Rubin & Daniels-Beirness (1983), and McBride (1984) have incorporated the Peabody Picture Vocabulary Test (PPVT), a measure of receptive language ability, into their play studies. While the PPVT is not usually used as a measure of cognitive ability, it does provide information on language abilities for descriptive purposes. Language abilities may influence play behaviors and further complement observational data from the Parten-Smilansky scales.

METHOD

The participants in this study were twenty females and twenty-three males ranging from three to five years, with a mean age of 4.5 years. The children attended two different classes at The Children's House, a preschool on the campus of Utah State University. Each classroom employed a multidisciplinary approach to learning. Both classrooms had an adult-child ratio of one to five and used the same classroom materials. The children attended either a morning or an afternoon session three hours daily Monday through Friday. For the duration of this study, room environments and play materials did not change. Behaviors were observed during center time, a period when children are free to move about choosing their own play activities. Center time occurs for one hour in the middle of each three-hour session after the children are appropriately "warmed up" for the day.

The first two centers, art and small manipulative toys, were illustrative of more isolate activities Quilitch & Risley, (1973),

Rubin (1982), and Vandenberg (1981). The art center included: paper, crayons, magic markers, paste, collage materials, paints, and colored chalk. The manipulative toy center included: puzzles, bristle blocks, Lego blocks, Lite Brite, magnets, and dominoes. The second two centers, illustrative of more social activities, were a dramatic play area and the blocks. The dramatic center included: costumes, hats, mirrors, doctor's office equipment, and puppets. The block center included: small and large wooden blocks, trucks, wooden people, and a free-form dollhouse.

The fifth center was the computer center, not traditionally available in most schools. The two computers were Commodore 64s with a single disk drive and Commodore color monitors #1701. The computers had been a part of the Children's House play environment for nine months prior to the study, and therefore were not a novel experience for the children. The computers had been used in two ways as learning centers: both teacher directed and self-selected. Every child had spent equal computer time, alone and with teacher-direction, prior to data collection. There was a selection process regarding software for the study. Twelve programs were evaluated by teachers and children and the two selected were deemed most appropriate for preschoolers and could be used in a variety of ways, as reflected in the results of a pilot study. The software used were Ducks Ahoy! and Seahorse Hide'n Seek, produced by CBS Software, Joyce Hakansson Associates.

In order to ensure equal access to all centers, certain school rules were developed and in operation six months prior to the study. All children were aware of and abided by these rules. Children's

play behaviors were coded every fifteen seconds as to: which center, and which nested social/cognitive type of play. Each child was randomly observed simultaneously by two raters during three ten minutes segments carried out over three different days. Both raters were blind as to the purposes of this study. Inter-rater reliability was assessed at midpoint and at the end of the study. Agreements exceeded 90%.

The PPVT was administered to all the children as a means of assessing receptive language abilities for descriptive purposes. Johnson (1979) reviewed the PPVT literature and found that reliabilities ranged from r=.67 to .87. On the other hand, Roupp et al (1979) indicated the PPVT reliability as .90 when used for assessing school readiness.

A sociometric evaluation consisting of four parts was administered to all participants as a means of assessing sociometric standing within the peer group. It included:

1) teacher ratings of each child's peer acceptance or rejection,
2) two five minute behavioral observations of actual social contact in the classroom done on two different days,
3) Peer ratings (Asher, 1978) of "children you like a lot" and "children you don't like." The test-retest reliability was r=.83 across a four-week period (Austin, Salehi, & Leffler, 1986).
4) Peer ratings (Peery, 1979) of "children you like to do specific things with" and "children you do not like to do specific things with." The Peery has three internal measures of reliability.

RESULTS AND DISCUSSION

Significance levels were set at .05 or above. The results will be discussed using the framework of the five questions to be addressed in this research.

Both descriptive statistics and analysis of variance total computer time x gender (2) ANOVA indicated no significant differences between the sexes in the amount of time spent at the computer $F(1,42)=.0191$, $p \leq .891$; males, $\bar{x}=445.43$, females, $\bar{x}=420.75$. It may be that preschool is the prime time to introduce both girls and boys to computer use in order to provide equal opportunities to become familiar with the computer. Stereotyping of computer play as a male activity may be less evident at the preschool level than in the elementary grades (Benderson, 1983). Also, similar numbers of girls and boys did not engage in any computer play - 40% of the girls and 39.1% of the boys. Equal access to the computers and other play centers has already been addressed. Future studies should be undertaken to investigate why certain children do not choose the computer during freeplay situations.

Secondly, the types of social and cognitive computer play engaged in by boys and girls was analyzed. A gender (2) x social (3) x cognitive (4) ANOVA for computer play was performed. No significant differences were found between the sexes in terms of social, cognitive, or nested social/cognitive computer play.

The third issue to be addressed was whether receptive language abilities affected computer play. Descriptive statistics and PPVT scores x sex (2) ANOVA indicated no significant differences between

the sexes (males, $\bar{x}$=102.65, females, $\bar{x}$=106.45), F(1,42)=.99842,1, p≤.324. The mean for all PPVT scores was 104.419 with a standard deviation of 12.431.

Pearson's r was run using PPVT scores with all social and cognitive categories of computer play, plus total computer time. No significant relationships were found.

A multiple regression analysis was done using PPVT scores as the independent variable. The dependent variables included the three social categories, the four cognitive categories, and the total computer time. Again, no significant differences were found between the receptive language abilities and the use of the computer.

A two-way interaction grouped PPVT scores x sex (2) ANOVA, resulted in significant differences for females and computer use, but not for males. Females' PPVT scores were grouped: Group I, those above the mean ($\bar{x}$=106.45) and Group II, those below the mean ($\bar{x}$=106.45). The range for Group I females was 108-139. The range for Group II females was 78-104. Significant differences at the .005 level were noted regarding total computer time. Females in Group I ($\bar{x}$=750.00) used the computer significantly more often than those in Group II ($\bar{x}$=152.09). Also Group I ($\bar{x}$=.2730) engaged in group computer play significantly more often than Group II ($\bar{x}$=.0080). Therefore, females with higher PPVT scores played significantly longer and in more group play at the computer than those with lower PPVT scores. No such differences were found for males. This correlates with the experimental segment of McBride's study (1984) which found that girls spent above average time at the computer and also had higher

PPVT scores.

The fourth question to be considered deals with sociometric status and computer use. Sociometric status appears to affect computer use. Pearson's r indicated a significant relationship between the positive quality of social interaction and the constructive level of cognitive play at the computer ($r=.3320, p \leq .030$). Children who exhibited prosocial behaviors also used the computer in a positive manner and on a cognitive level which significantly predominated in this study.

Further, significant relationships were found between the amount of dramatic play at the computer and the following sociometric status variables: children who used both verbal and nonverbal interactive modes with others ($r=.3111, p \leq .042$), children whose interactions had a predominantly negative quality to them ($r=.3898, p \leq .0110$), and children whose interactions had both negative and positive qualities ($r=.4113, p \leq .007$). All other correlations were nonsignificant. It may be that children who tend to interact dramatically with the computer in terms of shouting, yelling, cheering, etc. are also children who do not have highly developed social interaction skills. They tend to treat their peers either negatively, both negatively and positively combined, and also exhibit combinations of both verbal and nonverbal behaviors. These children, lacking in sophisticated social skills, may interact the same way with peers and the computer.

The final question of this research compared computer play with the four other types of traditional play. Analysis of variance between the five centers and the percentage of total play time spent

at each: Solitary (4) x Parallel (4) x group (4) x onlooker (1) x unoccupied (1) ANOVA yielded significant differences F (4,3009)=4.5615 $p \leq .0010$). Multiple range tests denoted significant differences at .050 between the computer center ($\bar{x}$=.6213) and the following two centers: manipulative toy center ($\bar{x}$=1.3405), and the dramatic center ($\bar{x}$=1.0598). Homogeneous centers with no significant differences included the computer center ($\bar{x}$=6213), the art center ($\bar{x}$=.5565), and the blocks center ($\bar{x}$=.8787). In terms of the total amount of play time observed, significant differences were noted between the computer center and the two most popular centers, manipulative toys and the dramatic center. However, the latter two also showed the highest standard deviations, suggesting that a few children spent large amounts of time engaged in those centers. In terms of time, the computer center was not significantly different from the blocks and art centers. This suggests that the computer is an appropriate preschool play center and the use of social/cognitive categories with it are also appropriate.

Analysis of variance between the five social categories and the percentage of total play time: Social (5) x Cognitive (4) x center (5) ANOVA indicated significant differences F(4,3009)=26.9078, $p \leq 0.0001$. Multiple range tests noted significant differences at .050 between group play ($\bar{x}$=1.9360) and all the other social categories: solitary ($\bar{x}$=.6372), parallel ($\bar{x}$=.5407), onlooker ($\bar{x}$=.0233), and unoccupied ($\bar{x}$=.0001). Observations of all centers from a social perspective resulted in group play being significantly different from all the other social play categories. More children engaged in group

play than any other social type. Preschoolers were shown to use the computer as a social activity, comparable to other traditional play activities. Computer use in this study encouraged social interaction, as suggested by Hawkins, Sheingold, Gearhart and Berger (1982), Brooks (1983), Mitchell (1983), Piestrup (1981), Swigger & Campbell (1981), and Vaidya (1983).

Analysis of variance between the four cognitive categories and the percentage of total play time: Cognitive (4) x Social (3) x Center (5) ANOVA denoted significant differences $F(3,2579)=34.7327$, $p \leq .0001$. Multiple range tests indicated significant differences at .050 between constructive play ($\bar{x}=2.2171$) and all the other cognitive categories: functional ($\bar{x}=.2744$), dramatic ($\bar{x}=1.2853$), and games with rules ($\bar{x}=.3752$). Observations of all centers from a cognitive perspective resulted in constructive play being significantly different from all other cognitive play categories. More children engaged in constructive play than any other cognitive type, which is consistent with Rubin (1982), Rubin, Maioni & Hornung (1976), and Rubin, Watson & Jambor (1978). Some interesting trends occurred in each center, lending construct validity to the study. Constructive play was most evident in the art center, manipulative toys center, and the blocks center. These would all be activities conducive to constructive interactions. Dramatic play was most apparent in the dramatic center, while games with rules play was most significant in the computer center. At the computer center, games with rules was the most frequently occurring cognitive level of play in all three social categories. This suggests

that perhaps computers do produce a more advance cognitive type of play, both individually and in group situations. Computers do provide another way for children to learn, both socially and cognitively.

In summary, computers can be used in preschool play settings. Computers serve to complement, rather than replace traditional learning. Computer play at the preschool level can be a socializing experience. Children of differing sociometric status tend to use computers in different ways. Also females with above average receptive language abilities tended to use the computers longer and in more group play situations than females with below average receptive language abilities. It will take imagination, open minds, and further study to determine the most effective use of computers in the preschool environment (Burg, 1984).

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